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AN OVERVIEW OF ACTIVITIES DIRECTED TOWARD LONG-TERM MAINTENANCE OF AIR QUALITY STANDARDS

John J. Silvasi, et al

Environmental Protection Agency
Research Triangle Park, North Carolina

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The report describes the Environmental Protection Agency's program concerning long-term maintenance of the national ambient air quality standards. Background information describes the historical development of and the rationale for the program. The report presents the legal requirements for States and discusses EPA's guidance and assistance available to States. The consequences of the program include the application of various kinds of measures, consideration of the scheduling of the measures, and the need for intergovernmental coordination, public participation, and participation from special interest groups.

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by

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AN OVERVIEW OF ACTIVITIES DIRECTED TOWARD LONG-TERM MAINTENANCE OF AIR QUALITY STANDARDS

BACKGROUND INFORMATION

Pursuant to the Clean Air Act, States were required to submit to the Environmental Protection Agency (EPA) in January 1972 implementation plans to attain and maintain national ambient air quality standards. For EPA approval, the plans had to contain, among other provisions, a demonstration that (1) the primary standards would be attained by June 1975, unless an extension of up to 2 years was granted, (2) the secondary standards would be attained within an unspecified "reasonable time," and (3) the standards would be maintained if they were already presently being achieved or after they were attained. EPA's specific requirements for the plan form and content appeared in the Federal Register of November 25, 1971, as 40 CFR Part 51. The regulations required that the control strategy for those areas whose air quality concentrations exceeded the standards provide for sufficient emission reduction for maintenance of standards "...including the degree of emission reduction necessary to offset emission increases that can reasonably be expected to result from projected growth of population, industrial activity, motor vehicle traffic, or other factors that may cause or contribute to increased emissions." [40 CFR 51.12(a)]. For areas whose air quality concentrations were already below a secondary air quality standard, the plan's control strategy had to be "...adequate to prevent such ambient pollution levels from exceeding such secondary standard." [40 CFR 51.12(b)].

EPA published initial approvals and disapprovals of State implementation plans (SIPs) in the Federal Register of May 31, 1972, as 40 CFR Part 52. In the preamble to the notice, EPA stated that maintenance of air quality standards would be accomplished through new and modified stationary source review procedures, new source performance standards, and the Federal Motor Vehicle Emission Control Program; also, at any time that EPA finds that a plan is inadequate to maintain standards, EPA would call for a plan revision.

On January 31, 1973, the U. S. Court of Appeals for the District of Columbia Circuit decided the case of Natural Resources Defense Council, Inc. (NRDC), et al. v. Environmental Protection Agency. The Court's order required EPA to review the air quality maintenance provisions of all SIPs and to disapprove plans "...which do not provide for measures necessary to insure the maintenance of the primary standard after May 31, 1975, and those plans which do not analyze the problem of maintenance of standards on a manner consistent with applicable regulations...." As a result, EPA again reviewed the SIPs. Most plans had adequately provided for review of new and modified stationary sources; for those plans which did not have such provisions, EPA either had promulgated, or would promulgate, such provisions. However, most plans had considered growth only over the period from plan development to the date of projected attainment of the primary standards (1975 or 1977). A few SIPs considered growth for a longer time period, but none considered growth beyond approximately 1980. Those few that did consider growth beyond the date of attainment did not consider all pollutants or all areas of the State, nor did they provide a mechanism for periodically updating the analysis. Furthermore,

none of the SIPs adequately provided for review of facilities which, though they themselves did not emit pollutants, caused activity (mobile source traffic, increases in electric power generation, and others) which resulted in emissions; these facilities were termed "complex" or "indirect" sources. Consequently, on March 8, 1973, EPA disapproved all SIPs for lacking adequate provisions to maintain air quality standards.

On April 18, 1973, EPA proposed a regulation requiring SIPs to provide for review prior to construction of indirect sources. This proposal was directed primarily at preventing high carbon monoxide concentrations in the vicinity of indirect sources. Such a review procedure would not be useful for control of broad area problems associated with photochemical oxidants nor carbon monoxide. Furthermore, the reviews could not be applied to every facility to be constructed since, in addition to working an administrative hardship, such review is questionable, since techniques for evaluating the air quality impact of individual small facilities lack precision. Thus a size cutoff would have to be selected below which new facilities would be exempt from review. The possibility would still remain, however, that growth of facilities smaller than the cutoff could collectively contribute to future violations of ambient air quality standards. As a result of these considerations, EPA promulgated on June 18, 1973, a regulation requiring that SIPs contain provisions, not only for indirect source review, but also for 10-year plans to ensure maintenance of all air quality standards where necessary. The following section elaborates on these requirements.

LEGAL REQUIREMENTS

LONG-TERM AIR QUALITY MAINTENANCE

Pursuant to 40 CFR 51.12(e) through (h), published in the Federal Register of June 18, 1973, and subsequently revised on May 8, 1974, (39 FR 16343), all SIPs are required to "...identify those areas (counties, urbanized areas, standard metropolitan statistical areas, et cetera) which, due to current air quality and/or projected growth rate, may have the potential for exceeding any national standard within the subsequent 10-year period." The State must identify these air quality maintenance areas (AQMAs) to EPA by May 10, 1974. EPA will then review the designations and, after making necessary additions or deletions, will publish a list of the areas by November 1974. The States must then perform a thorough analysis of the air quality impact of growth and development within the areas. If the analysis shows that an area will not maintain a standard during the 10-year period, the State must develop a plan for that area to maintain the standard, together with a demonstration of the effectiveness of the plan. The State must then submit to EPA the analysis of the area and, when necessary, the 10-year air quality maintenance plan (AQMP) by June 18, 1975. Then, every 5 years, the States must repeat the entire procedure: identify new areas which have the potential for violation of standards within 10 years or "dedesignate" areas identified before, analyze the areas to determine whether a violation will occur, and develop a plan if necessary to prevent such a violation.

For areas which are not covered by an air quality maintenance plan pursuant to 40 CFR 51.12(g), the measures taken to ensure maintenance

of air quality standards include review of new and modified direct and indirect sources, and modification or prevention of such facilities if they will result in a violation of air quality standards. If EPA becomes aware that such an area is experiencing a growth in emissions greater than that anticipated and which presents the potential for a violation of standards within 10 years, EPA would identify the area as a potential problem area pursuant to 40 CFR 51.12(f) and require of the State an analysis and 10-year maintenance plan if necessary. Furthermore, if such an area actually violates a standard, EPA would require an immediate plan revision to correct such a problem.

REVIEW OF INDIRECT SOURCES

Pursuant to 40 CFR 51.18, which was revised in the Federal Register of June 18, 1973, all SIPs must provide for the pre-construction review of new and modified sources, both direct and indirect. As originally promulgated, this regulation required the review of only new and modified stationary sources. As a result of the NRDC suit cited above, § 51.18 was revised to include review of new and modified indirect sources. Under the regulation, the State must determine whether the source would result in a violation of either the SIP control strategies or an ambient air quality standard. If such a violation would occur, the State cannot permit the facility to be constructed in the configuration or at the location proposed.

In amendments to the court order resulting from the NRDC suit, the court imposed the following timetable on EPA with regard to submittal of SIP supplements providing for maintenance of standards:

August 15, 1973 State submission of regulations

October 15, 1973	EPA approval or disapproval of State submittals
December 15, 1973	EPA proposal and promulgation of regulations for States with inadequate regulations.

EPA interpreted the court's order that the regulations which the States were to submit by August 15, 1973, were the indirect source regulations; two submittals were totally approved and one partially approved. Subsequently, the court granted EPA two extensions of the December 15, 1973, deadline, and EPA promulgated final substitute indirect source review regulations on February 25, 1974, for all States and territories except Florida and Guam (because Alabama's plan lacked provision for public comment, EPA promulgated those provisions for Alabama). Since the date of promulgation, several States have submitted plans which are being reviewed for adequacy. States can submit their own regulations at any time; if EPA determines that they are adequate, EPA will approve them and rescind its own promulgation.

EPA GUIDANCE AND ASSISTANCE

To assist the States in complying with the regulations pertaining to air quality maintenance, EPA intends to issue guidelines for acceptable techniques of analysis and to provide technical assistance to States. The following are the titles of guidelines which EPA will issue:

Volume 1: Designation of Air Quality Maintenance Areas
Volume 2: Plan Preparation
Volume 3: Control Strategies
Volume 4: Land Use and Transportation Considerations
Volume 5: Case Studies in Plan Development
Volume 6: Overview of Air Quality Maintenance Area Analysis
Volume 7: Projecting County Emissions
Volume 8: Computer-Assisted Area Source Emissions Gridding Procedure
Volume 9: Evaluating Indirect Sources

Volume 10: Reviewing New Stationary Sources
Volume 11: Air Quality Monitoring and Data Analysis
Volume 12: Applying Atmospheric Simulation Models to Air Quality Maintenance Areas

Other volumes will be added as necessary; for example, work is progressing on developing a volume which will describe a methodology for projecting and allocating emissions on a sub-county basis.

A discussion of the guidelines by subject matter follows.

AQMA DESIGNATION

EPA issued these guidelines on January 11, 1974, as OAQPS Guidelines Document No. 1.2-016 entitled, Guidelines for Designation of Air Quality Maintenance Areas. These guidelines present techniques which the States can use to determine which areas should be designated as AQMAs. The document indicates that, as a minimum, the States must consider the Standard Metropolitan Statistical Areas (SMSAs). The reasons for choosing SMSAs are:

1. SMSAs historically exhibit higher growth rates of population than non-SMSA areas.
2. SMSAs exhibit higher concentrations of population and industry than non-SMSA areas.
3. Projections of population and economic activity are available on an SMSA basis.
4. Areas of SMSAs change with time as population density increases, facilitating future changes in the designation of AQMAs.
5. SMSAs account for roughly 70 percent of the nation's population but only about 10 percent of the total land area.

The guidelines document offers a set of "initial designation criteria" by which the States can identify fairly obvious problem areas and eliminate from consideration fairly obvious non-problem areas without performing any

detailed calculations. Those areas which are not in either category must then undergo a preliminary projection of emissions and air quality to the year 1985. The guidelines present techniques for performing these rough projections. If an air quality standard is projected to be violated by 1985, then the area must be designated as an AQMA for that pollutant. Included with the guidelines to the States were projections of population and economic activity for each SMSA. The guidelines also address the geographical areas to be considered, assumptions which must be made concerning emission and air quality baselines, procedural requirements, and other items.

AQMA ANALYSIS

As required under 40 CFR 51.12(g)(1), States must perform an analysis of the growth in emissions and their impact on air quality of the designated AQMAs for the following 10-year period (1975-1985). If the analysis indicates that an area will not be able to maintain standards over that time period, the State must develop a plan to ensure that the standards will be maintained. EPA will issue a guidelines document to provide the States with techniques to perform the AQMA analysis. The following techniques will be included in the document:

1. Projection of emissions to 1985, considering
    a. Present emissions by source category and, if possible, by location,
    b. Expected growth of each source category based on past and probable future trends,
    c. Present and probable future emission restrictions on new and existing sources.

2. Allocation of the 1985 projected emissions to the area in both a most probable manner and a manner which would be indicative of the least desirable air quality, given the current zoning (to be sure that air quality concentrations are not underestimated).
3. Estimation of 1985 air quality concentrations from the projected emission distributions through the use of atmospheric dispersion models .

EPA has scheduled the issuance of these guidelines for August through October 1974.

10-YEAR PLAN DEVELOPMENT

By August 1974 EPA will issue guidelines to States on the preparation and submittal of 10-year air quality maintenance plans. These plans, which the States must submit to EPA by June 1975, will pertain only to those AQMAs which are determined by analysis to present a problem in maintaining standards. The guidelines will cover four subject areas:

1. Mechanics of preparing and implementing the plan. Topics will range from plan format to procedures for categorizing emission sources.
2. Evaluation of the air quality implications of local land use and transportation plans.
3. Maintenance strategies. This portion will discuss such measures as emission allocation, transportation controls, and fuel and energy conservation methods, and will present procedures to estimate quantitatively their impact on air quality.
4. Coordination of air quality maintenance plans with other environmental planning activities. These activities include water quality

planning and the review of environmental impact statements.

REVIEW OF INDIRECT SOURCES

The guidelines will contain methods for estimating emissions from seven types of indirect sources: shopping centers, airports, sports complexes, parking facilities, amusement parks, major highways, and recreational areas. The guidelines will also present methods to relate air quality with certain traffic parameters such as traffic volume, traffic demand, roadway capacity and roadway type.

OTHER RELEVANT GUIDELINES

Air Quality Monitoring Guidelines

To aid in the proper selection of air quality data for use in projecting air quality and in the improvement of air quality monitoring networks, EPA will issue guidelines in September 1974 which will discuss the following topics:

1. Validation of air quality data.
2. Interpretation of air quality data as it relates to the national ambient air quality standards.
3. Evaluation and selection of air quality monitoring instruments for criteria pollutants.
4. Network design and instrument siting.
5. Calculation and evaluation of air quality trends.
6. Evaluation and interpretation of air quality data.

New Source Evaluation Guidelines

These guidelines are being designed for use in evaluating the individual impact of new sources once their location and design characteristics are known. The methodology is expected to incorporate the effects on

pollutant dispersion of increased turbulence and roughness encountered in urban areas as well as the impact of multiple sources.

CONTRACTUAL ASSISTANCE

In addition to technical consultation through the Regional Offices, EPA will offer two kinds of contractual assistance to States concerning the air quality maintenance program: (1) the performance of example analyses and development of example plans for selected areas, and (2) direct contractual aid.

Example Analyses and Plans

Before the guidelines on the development of 10-year plans are distributed to the States in final form, EPA will develop trial air quality maintenenace plans for selected areas to obtain a working knowledge of the maintenance plan development process. This work will be done under contract. The purposes of this exercise are:

1. To discover deficiencies in the draft guidelines so that they can be corrected before the final guidelines are published.
2. To provide an example from which States can pattern the format of their analyses and plans.
3. To provide through the process of data collection, indications of the sources of information which could be consulted.
4. To provide the selected areas with a start in collecting data, performing the analyses, and developing plans.

Direct Technical Assistance

During all three phases of the long-term air quality maintenance program (AQMA designation, AQMA analysis, 10-year air quality maintenance plan development), EPA will provide assistance to States which need it.

During the analysis and plan development phases, such assistance could include:

1. Consultation on the methods of analysis and plan preparation.
2. Assistance in updating and formulating the State's emission inventory.
3. Assistance in collecting and assembling pertinent demographic, economic, and developmental projections and other information needed to project emissions and air quality.
4. Assistance in projecting emissions and air quality.
5. Assistance in analyzing various air quality maintenance strategies for their effect on air quality in the State.
6. Assistance in preparing 10-year air quality maintenance plans. In rendering this assistance, specialized contractors may be employed.

TIMETABLE

The overall schedule of events relating to long-term air quality maintenance is presented in Figure 1.

CONSEQUENCES OF AIR QUALITY MAINTENANCE PROGRAM

Through the regulations published on June 18, 1973, EPA intends to enable State and local governments to integrate air quality considerations into plans for growth and development so that air quality standards will be maintained. EPA has neither the intention, nor the desire, nor the capability of assuming control over land use for every area of the country. Nor does EPA intend for air pollution control agencies to effect the only control over land use. The maintenance of ambient air quality standards is EPA's primary objective in this matter. EPA's mandate for maintenance of standards is also, however, a mandate to employ, where necessary,

FIGURE 1

ACTIVITY SCHEDULE FOR MAINTENANCE OF

AIR QUALITY STANDARDS

1974	JAN.	EPA ISSUES GUIDELINES FOR DESIGNATING AQMAs
	MAY	STATES SUBMIT AREAS TO BE DESIGNATED AS AQMAs
	JUL./AUG.	EPA PROPOSES AQMA DESIGNATIONS
	SEPT.	EPA ISSUES PLAN DEVELOPMENT GUIDELINES TO STATES AND PROPOSES REGULATIONS ON SAME IN FEDERAL REGISTER; EPA BRIEFS REGIONAL OFFICES ON GUIDELINES
	OCT.	EPA PUBLISHES FINAL LIST OF AQMAs
	NOV./DEC.	EPA PUBLISHES FINAL REGULATIONS ON PLAN DEVELOPMENT IN FEDERAL REGISTER
1975	FEB.	STATES COMPLETE DRAFT OF AQMPs
	APRIL	STATES ANNOUNCE HEARINGS; MAKE DRAFT PLANS AVAILABLE
	MAY	STATES HOLD PUBLIC HEARINGS STATES REVISE PLANS, AS NECESSARY, BASED ON PUBLIC HEARINGS
	JUNE	STATES SUBMIT PLANS TO EPA EPA STARTS PREPARING PLANS FOR STATES THAT DID NOT SUBMIT PLANS OR SUBMITTED INADEQUATE PLANS
	SEPT.	EPA PUBLISHES PROPOSED APPROVAL/DISAPPROVAL ACTION ON AQMPs
	OCT.	EPA APPROVES/DISAPPROVES AQMPs; PROPOSES PLANS FOR STATES THAT DID NOT SUBMIT ADEQUATE PLANS EPA ANNOUNCES HEARINGS ON PLANS FOR STATES THAT DID NOT SUBMIT PLANS OR SUBMITTED INADEQUATE PLANS
	NOV.	EPA HOLDS PUBLIC HEARINGS ON PLANS DEVELOPED FOR STATES THAT DID NOT SUBMIT PLANS OR SUBMITTED INADEQUATE PLANS
	DEC.	EPA PROMULGATES PLANS FOR STATES THAT DID NOT SUBMIT PLANS OR SUBMITTED INADEQUATE PLANS

techniques which have not been traditionally used in air pollution control endeavors. As stated in Section 110 of the Clean Air Act, these techniques specifically include land-use and transportation controls. Thus, the maintenance of air quality is only another constraint on emissions and their distribution which, in turn, constrain, but by no means determine, land use. Since the primary responsibility for the development of the State implementation plans rests with the States, and since the submittals required by 40 CFR 51.12 are to be a portion of the SIP, the primary responsibility for applying land-use and transportation controls rests with the States. The States, of course, can delegate responsibility for the entire plan, or portions thereof, to local agencies or governments, as long as the States retain ultimate responsibility should the local agencies or governments later be unwilling or unable to implement the plan. For areas where a State does not adequately provide for the maintenance of air quality standards, EPA must, under law, impose measures which would provide for such maintenance.

There are many techniques for maintaining standards. In the guidelines on the development of 10-year air quality maintenance plans, there are a number of possible alternatives. For example, one possible administrative mechnism would be to approve a general community development plan which has been found to provide for maintenance of air quality standards, and then to approve any specific development consistent with the general plan (as regards air pollution) after also checking the localized air quality impact of the proposed new development. The mechanism, of course, requires a review procedure which will burden the agency which administers this mechanism, but this scheme permits any agency or organization, public

or private, to know in advance where development can occur without causing air pollution problems.

CONTROL MEASURES WHICH MAY BE EMPLOYED

EPA's guidelines on the development of 10-year air quality maintenance plans will discuss a number of control measures which States can employ in their plans.

Depending on the nature and magnitude of the problems in maintaining standards, the analysis of an area and the plan to provide for maintenance will vary in complexity from location to location. If the analysis shows that one particular area may not violate the standards until, perhaps, 1983, that area's plan may call for only minimal additional control measures until, perhaps, 1981 or 1982. On the other hand, another area may be more populous and be experiencing more growth than the first area. The analysis of such an area may be more difficult to perform since the distribution of emissions may be more complicated, and the application of the projection technique to these emissions will further compound the difficulty. Furthermore, this area's plan may well have to contain a majority of the control measures mentioned below, and the area may have to start implementing some of those measures immediately or in the very near future.

The type of violation of air standards which is projected may demand a particular approach to a solution. For instance, if the projected violation is expected at a few "hot spots" caused by the projected expansion of a few sources, then the strategy may concentrate on controlling the emissions from or the expansion of those few sources. The new source review procedure is expected to prevent the construction or modification of significant stationary emission sources in such "hot spots." On the

other hand, if the projected air quality standard violation is not restricted to limited locations, but prevails throughout an area, then the strategy would have to provide for either a general tightening of existing regulations, or control of growth which induces new emissions, or both.

Also, the type of pollutant may determine the type of strategy to be employed. For instance, there may be relatively few areas designated as AQMAs for carbon monoxide because significant reductions in carbon monoxide emissions are expected through the Federal Motor Vehicle Emission Control Program and new source performance standards for stationary sources. The areas that are designated for CO, however, may require additional transportation control strategies to eliminate traffic congestion which would lead to local high CO concentrations. With regard to particulate matter and sulfur dioxide, the measures taken to maintain standards may entail further control of emissions from area source fuel combustion or control over the growth of such sources. Such measures will be difficult to implement. Photochemical oxidants have already presented a significant problem in the development of attainment strategies for some areas. Strategies to maintain the oxidant standard would have to provide further reductions in mobile source emissions, at least until the Federal Motor Vehicle Emission Control Program's effect on hydrocarbon reduction becomes more significant. The oxidant strategy may also require additional control over stationary hydrocarbon sources. With regard to nitrogen dioxide, the few areas which appear to present a problem will probably have to curtail stationary as well as mobile source emissions to a greater extent.

The guidelines document will discuss methods used to control emissions and methods used to control activities which produce emissions. These

methods are listed and briefly defined below:

Methods to Control Emissions

1. Emission density zoning, a regulatory system in which the maximum legal rate of emissions of air pollutants from any given land area is related to the size of the area. Such a system employs an emission limitation in terms of mass of emissions per unit area per unit of time. The area of consideration can be the property of the source, a predetermined area of a region, or a "floating radius" in which the source cannot exceed the emission density limit of the area within a certain distance from the source.
2. Emission allocations, a regulatory system in which the total tolerable emissions for an entire region are determined, and the maximum allowable rate of emissions of air pollutants from any given political jurisdiction or other sub-area is assigned through a democratic process. Suitable procedures are provided to ensure that allowable emissions are not exceeded for any sub-area.
3. Transportation controls, including measures discussed in the preamble to State implementation plan transportation controls published in the Federal Register on November 6, 1973. These measures are designed to increase the attraction of various forms of mass transit and to discourage the low-occupancy use of automobiles. Such measures include: on-street and off-street parking reductions, regulatory parking fees for mass transit augmentation, vehicle-free zones, bus and carpool programs stressing preferential treatment (such as free parking), bikeways and heavy-duty vehicle restrictions.

4. A procedure for ensuring that proposed new or modified buildings, structures, facilities, or installations, including municipal waste-water-treatment facilities, will not lead to a development pattern in which air quality standards would be exceeded. Such a procedure would entail a review of projected development induced by the facilities, the vehicle trips induced by the construction of such facilities, and the increase in load on electrical generation and solid waste disposal facilities.
5. Fuel and energy conservation measures. These would include measures such as revision of building codes to reduce thermal loss, reduction of heating and cooling requirements, greater use of multiple-family structures, revised scheduling of industrial activities, vehicle use restraints, and fuel consumption restrictions on new vehicles.
6. District heating, a more efficient heating method than individual unit heating. For instance, the waste heat from an electric power generation station (which can account for 60 percent of the heat in the fuel used) could be piped to industrial, commercial, and residential buildings for space heating or for process heat.
7. Regulatory and other types of strategies to guide the development of area, point, and line sources, including regulations for zoning, subdivisions, location of water treatment facilities, capital improvement programming, open space reservations, and use of schemes such as green belts, satellite cities, and finger developments.
8. More restrictive emission controls for both stationary and mobile

sources and new source performance standards.

9. Application of emission charges, which would provide an incentive to control emissions for the sake of economy. Such a system could have a variable rate structure to inhibit sources from locating in areas at or slightly below the air quality standard concentrations.
10. Tighter control over construction activities, including grading and burning, road dust, erosion of soil onto roads, truck terminal dust, etc.
11. Any other pertinent strategies which are found to be necessary and applicable, including all gas or all electric heating.

Methods to Control Activities which Produce Emissions

An AQMA or localities within an AQMA may have plans for transportation, land use, waste water treatment, solid waste disposal, and other functions. These plans would be analyzed for their impact on air quality. This analysis may indicate that one or more plans will not ensure the maintenance of ambient air quality standards. These plans would have to be revised so that air quality standards would not be violated. Where an area's plans are compatible with air quality, legal mechanism would then be employed to ensure that any new development would occur in accordance with the plan. This approach would be an ideal one since, once the analysis of air quality impact indicates that a plan ensures the maintenance of air quality standards, no further analysis of impact of individual facilities is needed if the facilities are built in accordance with the plan (some new facilities would, of course, still have to undergo stationary and indirect source review where appropriate). This approach, however, is long-range and would probably not be available for immediate implementation. Prior to its implementation,

short- and medium-range approaches, such as those mentioned above, would have to be applied.

SCHEDULING OF IMPLEMENTATION

EPA will accept several forms of scheduling the implementation of control measures. The following are examples of such implementation scheduling:

1. Progressive phased action, a scheme by which the State institutes a number of measures but implements them one or a few at a time as necessary. Thus, as air quality concentrations approach some predetermined level (below the standard, of course), the first measure or set of measures is implemented; as subsequent growth in emissions occurs and concentrations once again approach the predetermined level, the next measure or set of measures is implemented. The process is continued for as long as necessary. This scheme assumes that the State has the legal authority to implement the measures.
2. Future-effective-date laws, a scheme whereby the State schedules for the future various control measures and the acquisition of the necessary legal authority to implement them.
3. Area-by-area application, whereby the State schedules control measures for different areas of a single AQMA at different times if the situation warrants such scheduling. For instance, for two areas of an AQMA whose emissions are growing at different rates, the State may institute a given set of control measures for the faster-growing area on an earlier schedule than for the slower-growing area.

INTERGOVERNMENTAL COORDINATION

Air Quality and Other Functional Relationships

As discussed above, an approach which may be included in the air quality

maintenance plan calls for the development of plans for transportation, land use, waste water treatment, open space, and solid waste disposal which are consistent with air quality standards. This approach requires a knowledge of the relationships between air quality and these functions. Examples of such relationships are discussed below.

Air Quality and Transportation - A planned transportation system which results in additional usage of individual mobile sources will increase emissions over a situation where no such result occurs. Conversely, a transportation system which causes a decrease in the use of mobile sources will effect a consequent decrease in emissions. Such relationships must be tempered by consideration of several factors such as the effects of speed and the Federal Motor Vehicle Emission Control Program on emissions and the spatial arrangement of the transportation system. Section 109(j) guidelines which implement section 136(b) of the Federal Aid Highway Act of 1970 require that the cognizant air pollution control agency certify that the transportation plan for each urbanized area of over 50,000 population is consistent with the State implementation plan for clean air.

Air Quality and Land Use - A land use plan for an area describes a projected or desired pattern of locations of various activities in the area. The manner in which the land is used has an impact on air quality. Population density, for instance, affects emission density. If an urban area has a low population density, it would not be economical to have an extensive mass transit system since the population would be dispersed. Because people would have to rely on automobiles for transportation, a greater amount of emissions would probably result than for an area with the same population, but whose population density and reliance on mass transit were greater. Also, the

spatial distribution of open spaces would affect air quality concentrations. In the development of land use plans, therefore, the region would have to consider alternative population densities, spatial arrangements, and other factors which would minimize air quality impact.

Air Quality and Waste Water Treatment - Waste water treatment can affect air quality either directly or indirectly. Incineration of treatment plant sludge can result in direct emissions; construction or extension of treatment facilities can stimulate industrial, commercial, and residential growth which, in turn, may result in an increase of emissions from stationary sources themselves or from increased mobile source use. Section 208 of the Federal Water Pollution Control Act Amendments of 1972 requires that areawide waste management planning consider possible impacts of facilities on air quality.

Air Quality and Open Space - Because of the roughness over urban areas due to the concentration of buildings, wind speeds over urban areas are generally less than in the surrounding countryside and therefore are not as efficient in the dispersion of air pollutants. Another phenomenon aggravating the air quality problem is the "urban heat island" effect, in which the atmosphere over the urban area is generally warmer than the surrounding countryside due to the predominance of heat-retaining buildings and streets. This heat island produces air currents which rise over the center of the city, spread outward, subside at the edge of the urban area, and flow along the ground toward the center and then rise again. Such an air circulation system entrains pollutants within itself and inhibits their transport away from the urban area. Both the urban roughness and the heat island effect can be partially alleviated by the use of lower concentrations of buildings and streets and more vegetation. Open spaces, such as parks, can be of help in this matter.

Air Quality and Solid Waste Disposal - New incinerators which are planned to dispose of additional solid waste generated or to replace existing outmoded facilities will have to meet stringent emission requirements so that they will not violate ambient air quality standards or new source performance standards.

Government Agencies

Ten-year air quality maintenance plans will affect areas over which State and local governmental agencies other than air pollution control agencies have jurisdiction. To avoid any conflict over functions, the State will have to develop its plan with the ongoing assistance and coordination of these other agencies. Indeed, these agencies will probably play important roles in the development and implementation of the air quality maintenance plan. Specific governmental (and quasi-governmental) bodies which will probably have an interest in maintenance plan development and implementation include:

1. State level
    a. Environmental protection and natural resource agencies.
    b. General planning agencies.
    c. Economic development agencies.
    d. Transportation agencies.
    e. Utility commissions.
2. Local level
    a. Environmental protection agencies.
    b. General planning agencies.
    c. General purpose governments.
    d. Health departments.

e. Highway departments.

f. Mass transit authorities.

g. Sanitation departments.

h. Solid waste collection and disposal departments.

i. Parks commissions.

j. Zoning boards.

3. Regional level

a. Planning agencies.

b. Councils of governments.

c. Transportation agencies.

EPA guidelines on the development of the 10-year AQMPs will discuss possible mechanisms for effecting coordination among the governmental bodies.

Coordination

To be effective, coordination of air quality maintenance activities with other environmental protection and comprehensive planning activities must occur at the regional level. Air quality is inherently a regional problem that transcends city-county political boundaries. At this level there has been a traditional separation of planning and environmental protection activities. Time constraints on the preparation and submission of AQMPs preclude, for the most part, significant local agency reorganization. Therefore, arrangements between existing regional and organizational cooperative agencies will have to be made for air quality maintenance planning. Existing coordination mechanisms include the A-95 review and the Environmental Impact Statement (EIS) preparation processes. A-95 review refers to the State and regional review of federally-funded projects through a system

of clearinghouses. The review process and clearinghouses were established by Office of Management and Budget's Circular No. A-95, the most recent edition of which was published in the Federal Register of November 28, 1973 (38 FR 32874). Existing coordinating agencies include councils of governments (COGs) and regional planning councils (RPCs).

Coordination Mechanisms - Because State air pollution control agencies normally have Federal program grants and the ultimate responsibility for the development of the AQMP, there appears to be justification for requiring that the AQMP be coordinated through the A-95 review system. Agencies involved with the A-95 clearinghouses should be involved early in the development of the AQMP to ensure the identification and resolution of problem areas prior to the formal processing of the AQMP through the A-95 system.

The procedures used for review of environmental impact statements can also be used for the coordination of the AQMP. Subject to the specific legal requirements of the State, the EIS process may also be required for private activities. Such a requirement would provide a valuable tool for the agency implementing the AQMP in that it will permit early review of private projects to determine their compatibility with the AQMP and their impact on air quality.

Coordinating Agencies - COGs and RPCs, which represent an approach by city and county governments to resolve regional problems, have inherent limitations that must be considered prior to using these agencies for coordination of air quality maintenance activities. These limitation are:

1. In most cases, a lack of an air quality element in the existing structures.
2. Input to the A-95 review process occurs late in the planning cycle.

3. COGs and RPCs are primarily designed to serve in an advisory capacity or as a forum for communications.

4. Participation of city and county governments is voluntary.

Coordination Framework Alternatives - Two types of arrangements seem to present the essential coordination framework alternatives. The first of these would incorporate air quality objectives in a basic comprehensive planning agency; the second would authorize a single-purpose air quality agency to review and evaluate land use and transportation plans submitted by local governments in its jurisdiction. EPA's guidelines will discuss these concepts and present advantages and disadvantages of each.

PUBLIC PARTICIPATION

As required under the Clean Air Act, the State must subject its implementation plan to public hearing before submitting it to EPA. Since the plan will ultimately affect the general public by possibly influencing the manner in which communities develop and grow, it is necessary to determine community purposes and goals in order to establish acceptable objectives and programs. So that the public may have a thorough knowledge of the impact of the plan in order to participate effectively in the decision-making process, the State should disseminate information as widely as possible in the areas to be affected. In addition to the minimum public hearing and plan availability regulations of 40 CFR 51.4, the State should attempt to sponsor open forums on the plan by means of the various communication media.

PARTICIPATION FROM SPECIAL INTEREST GROUPS

In addition to coordination among governmental agencies and the solicitation of public participation, the State should attempt to obtain and consider the legitimate concerns of various special interest groups which

may be affected by an air quality maintenance plan. Such groups include, on one hand, chambers of commerce, electric utility companies, natural gas suppliers, and the like, and, on the other hand, environmental, consumers', and other public organizations. Such consultation may serve to avert later confrontation with these same organizations.